

■ Interior cells
▨ Boundary cells

Fig. 1

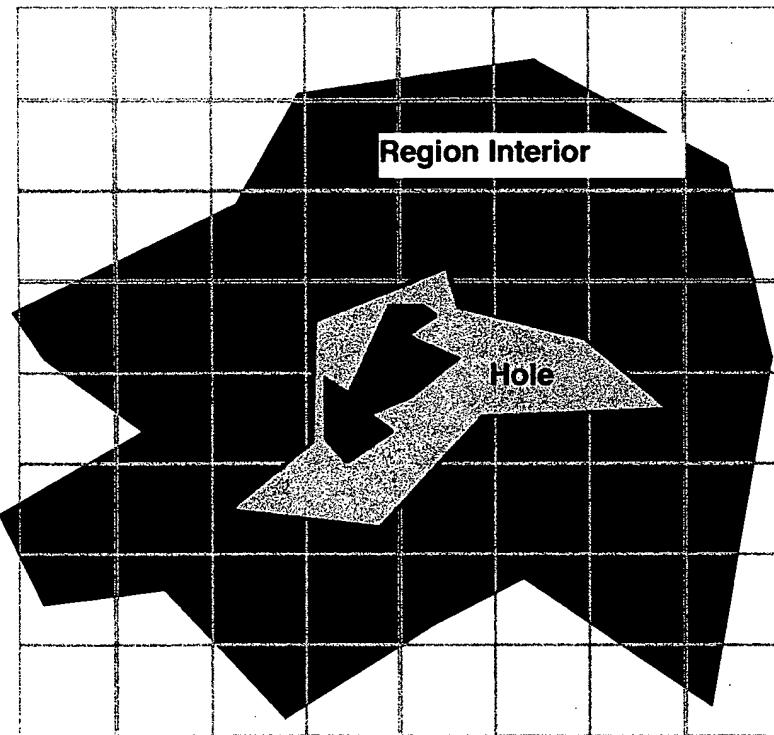


Fig. 2

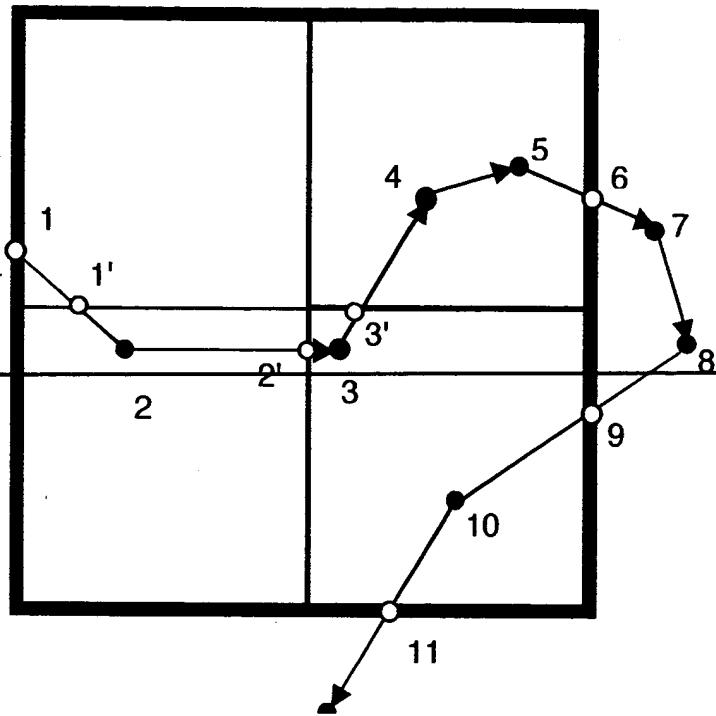


Fig. 3.

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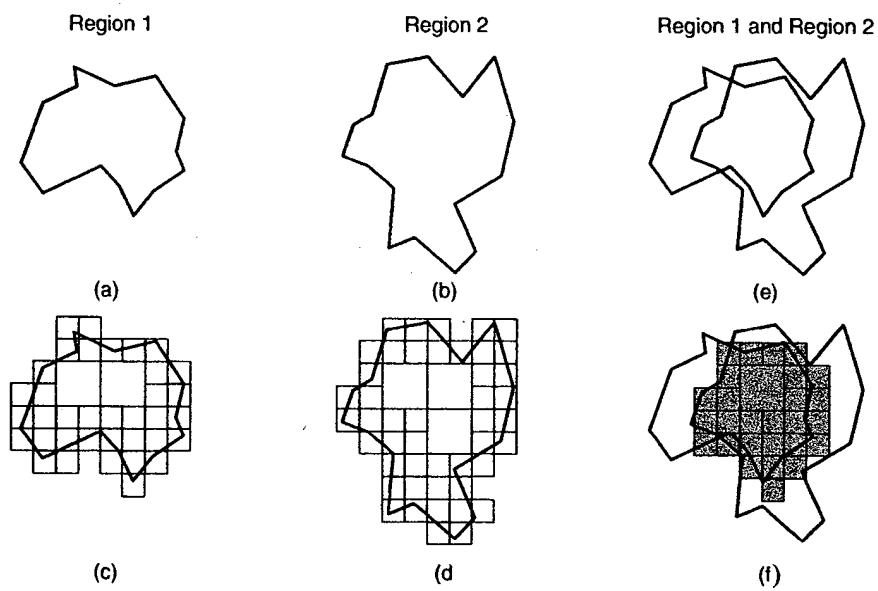


Fig. 4

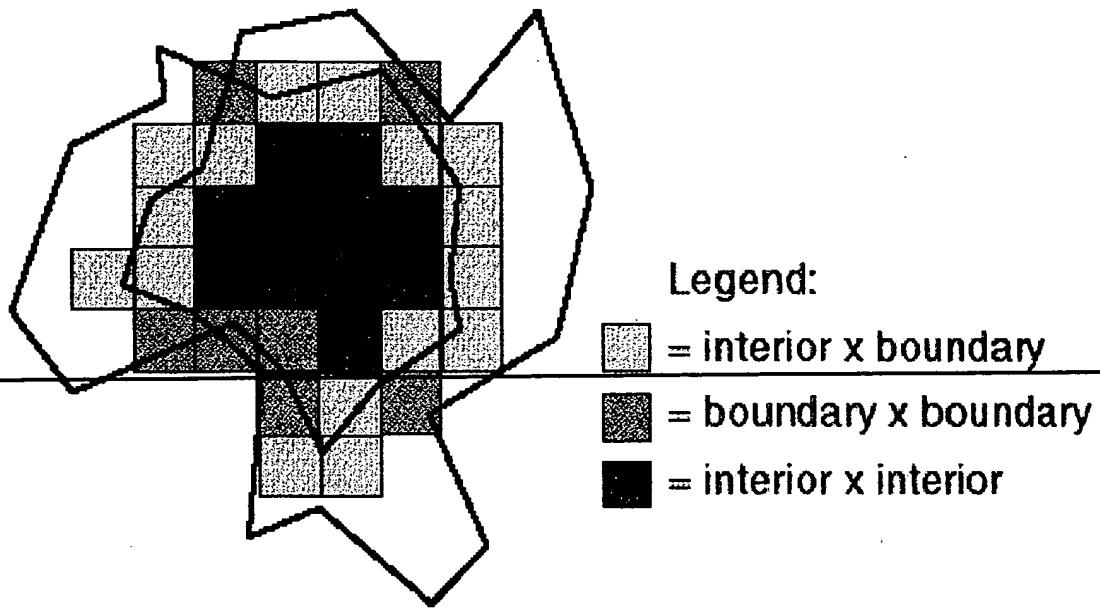


Fig. 5

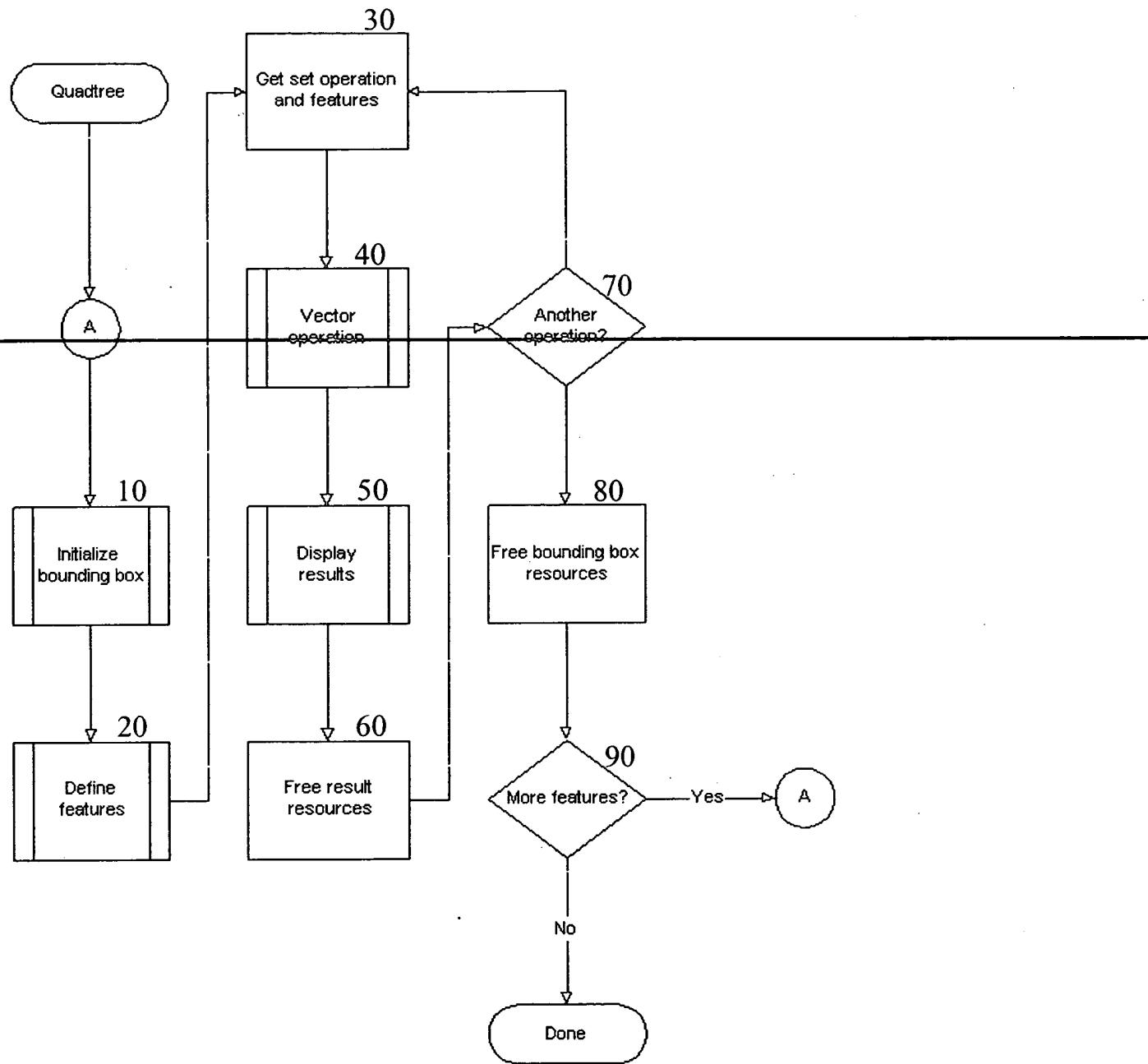


Fig. 6

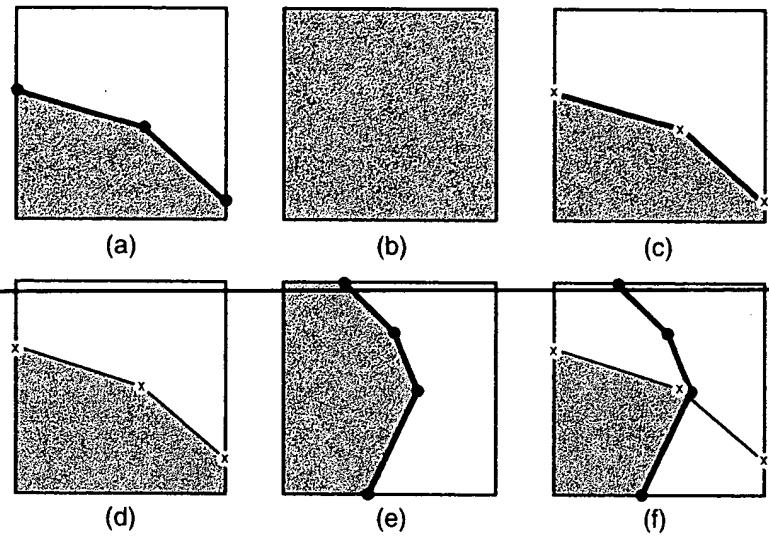
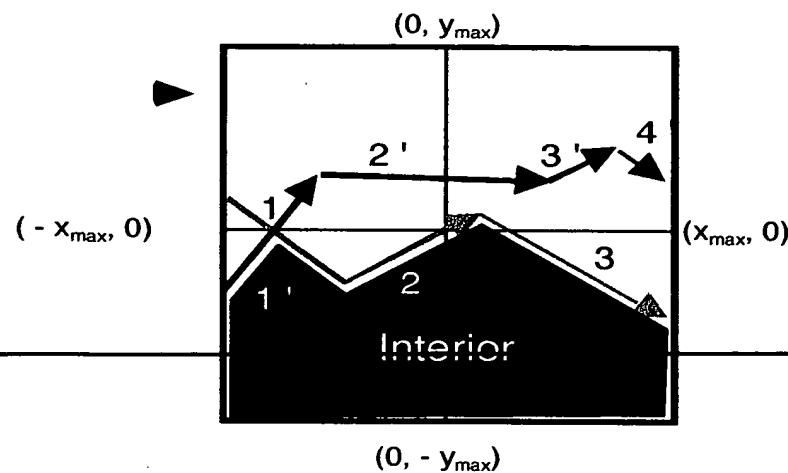


Fig. 7



The two bounding boxes associated with the first two tuple-pairs from both features intersect as shown to the right

The bounding boxes associated with the second set of tuple-pairs do not intersect

In the case to the right, two black line segments must be evaluated for intersection with a single red line segment.

Line segment intersection cases

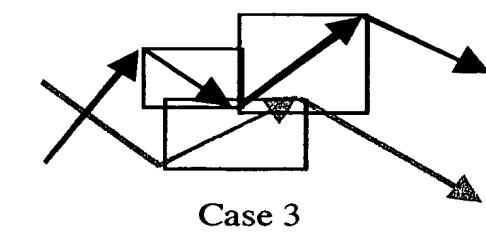
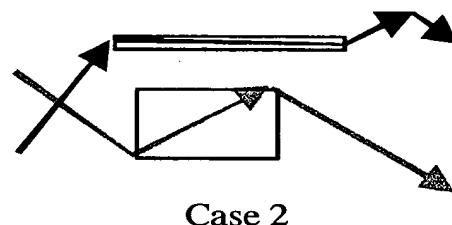
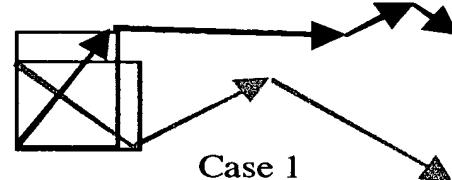


Fig. 8.

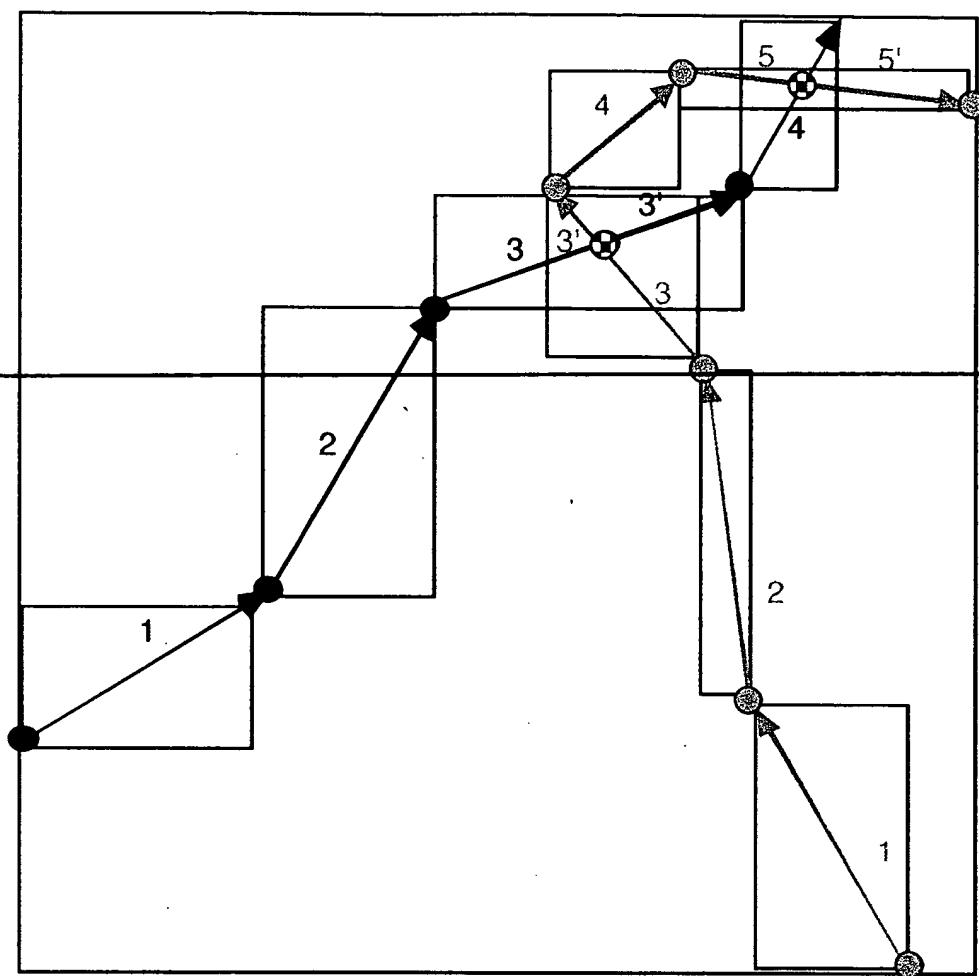


Fig. 9.

0 0 0 0 0 0 0 0 0 0 0 0

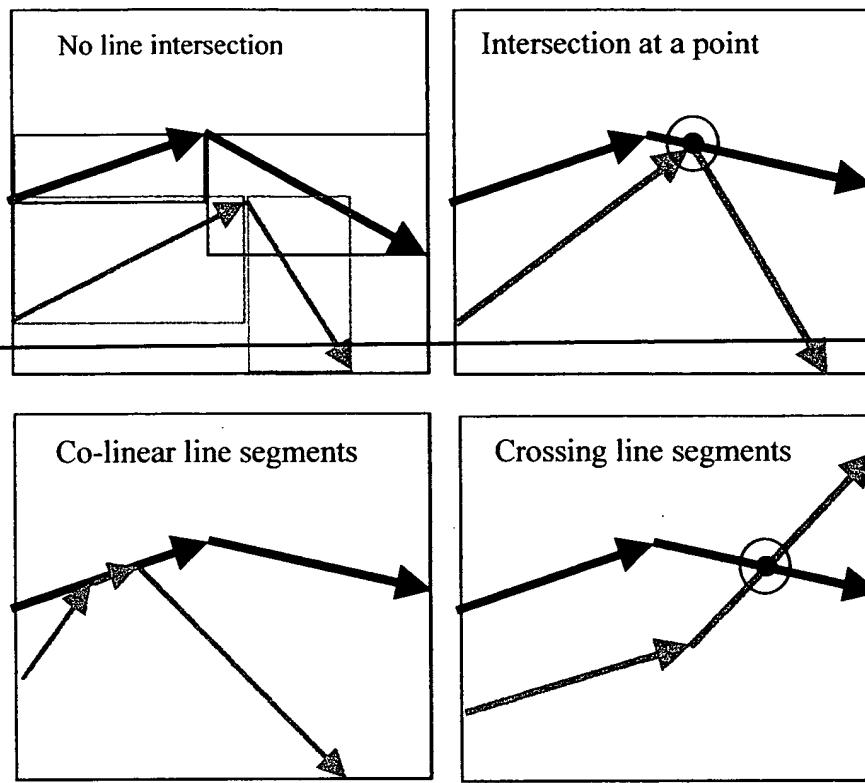


Fig. 10

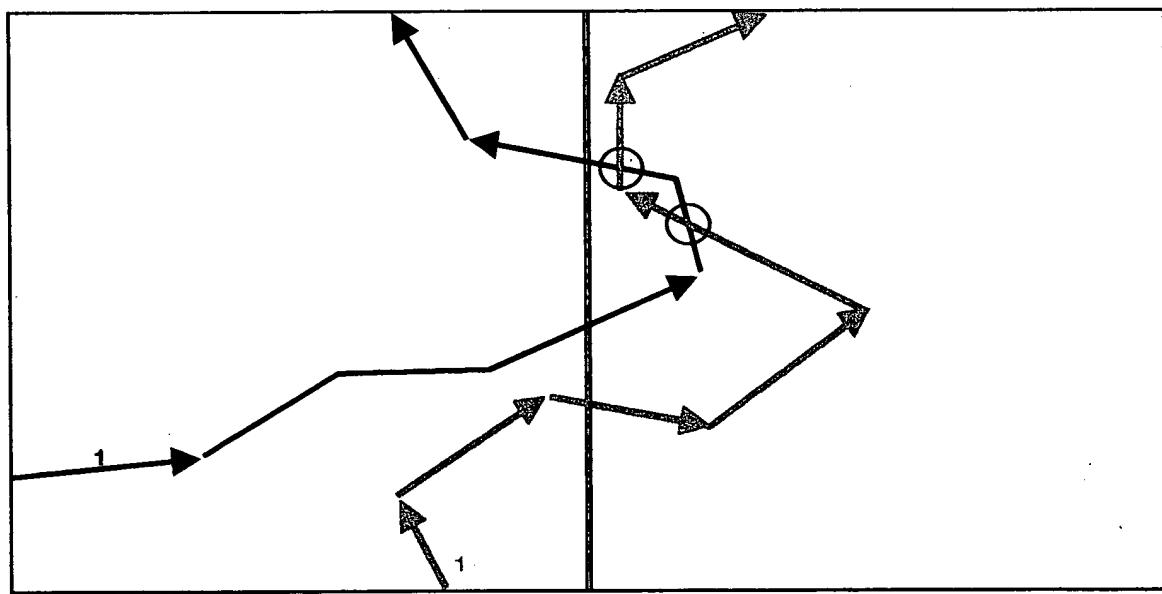


Fig. 11

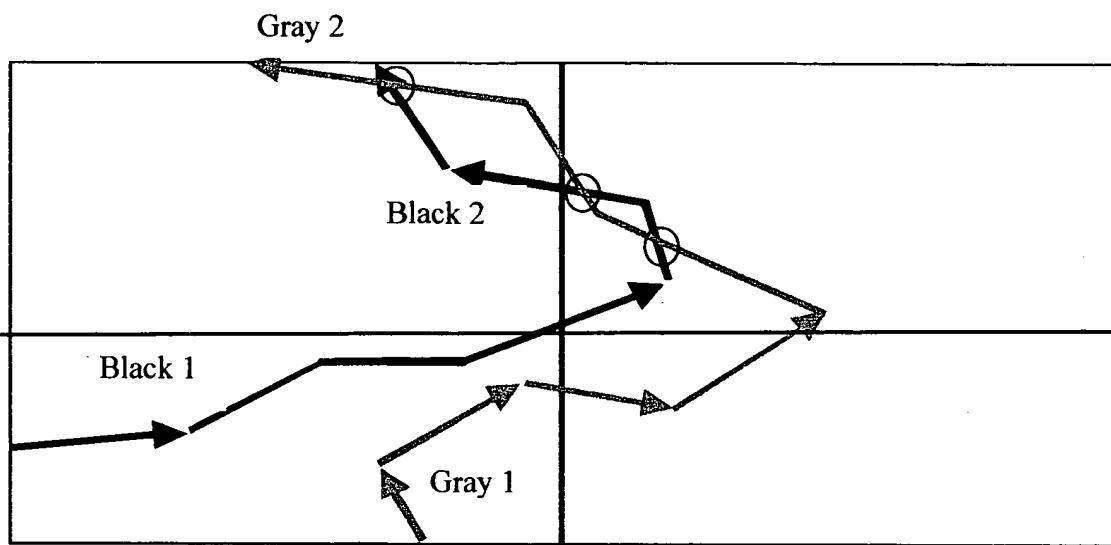


Fig. 12

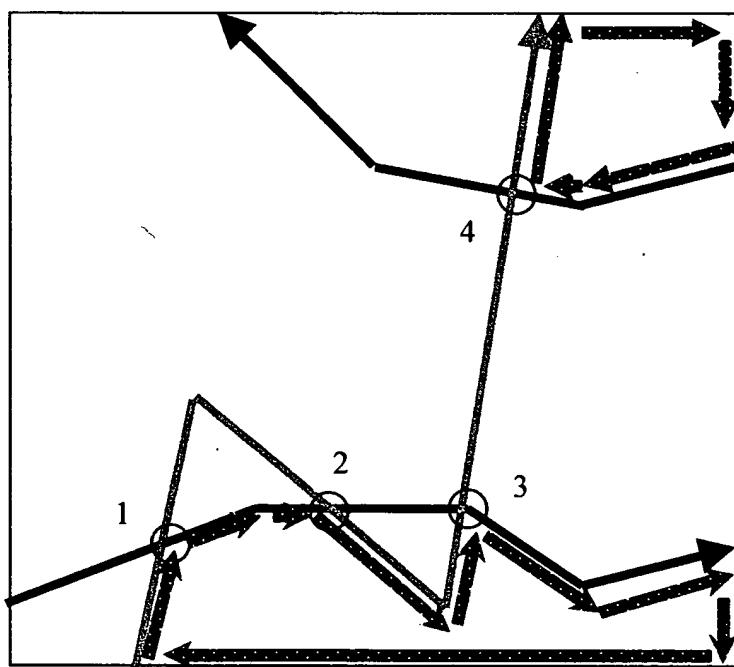
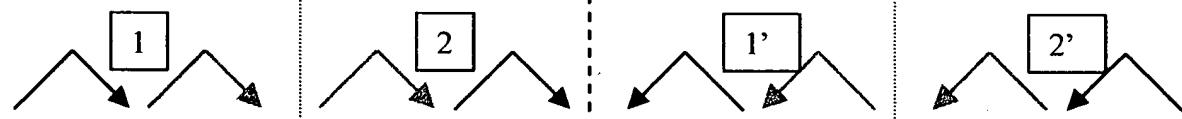


Fig. 13

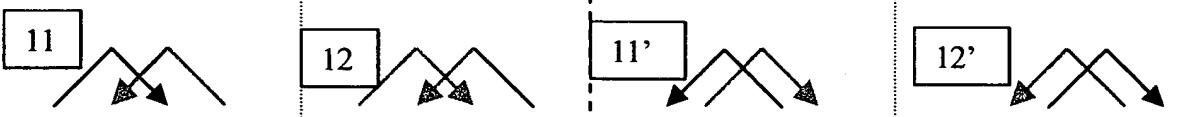
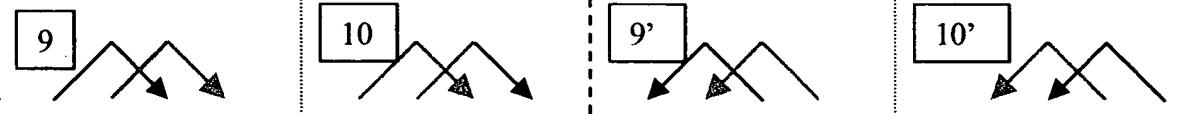
Possible cell entrance/exit point combinations



Disjoint



Enclosed



Partial overlap

Fig. 14

Entry/Exit Relationship	Class	Begin point for first cycle (inside is "to the right") Intersection	Begin point for first cycle (inside is "to the right") Union	Begin point for first cycle (inside "to the left") Intersection	Begin point for first cycle (inside "to the left") Union
$G_E G_X B_E B_X$	I	First intersection point of black or gray feature (<u>Null</u> if no intersect points)	Pseudo points (B_E and G_E)	Pseudo points (B_E and G_E)	First intersection point of black or gray feature (<u>Full</u> cell if no intersect points)
$G_E B_X B_E G_X$	II	Pseudo points (B_E and G_E)	First intersection point of black or gray feature (<u>Full</u> cell if no intersect points)	First intersection point of black or gray feature (<u>Null</u> if no intersect points)	Pseudo points (B_E and G_E)
$G_E B_E B_X G_X$	III	Pseudo point B_E	Pseudo point G_X	Pseudo point G_E	Pseudo point B_X
$G_E B_E G_X B_X$	VI	Pseudo point B_E	Pseudo point G_X	Pseudo point G_E	Pseudo point B_X
$G_E G_X B_X B_E$	IV	Pseudo point G_E	Pseudo point B_E	Pseudo point B_E	Pseudo point G_E
$G_E B_X G_X B_E$	V	Pseudo point G_E	Pseudo point B_E	Pseudo point B_E	Pseudo point G_E

Application of table:

Follow specified boundary entrance feature, accumulating intersection and/or union cycles until all polyline intersection point tuples in the cell have been exhausted.

Cycles alternate systematically along the specified entrance feature between contributions to intersection and union.

Cycles are completed when they close on themselves. The implicit boundary-closing segments of a boundary-closing cycle are not actually represented in the generated product.

Comments:

As is apparent from the above formulation, intersection and union are effectively dual operations. The set operation generation procedure is similar regardless of the ordering convention of the polygon tuples (clockwise or counter-clockwise oriented), reflected in the symmetry observed within the above table.

Note that the classes are grouped into pairs. Classes I and II involve *inverse* operations; Classes III and VI employ identical generation operations, as do Classes IV and V.

Fig. 15

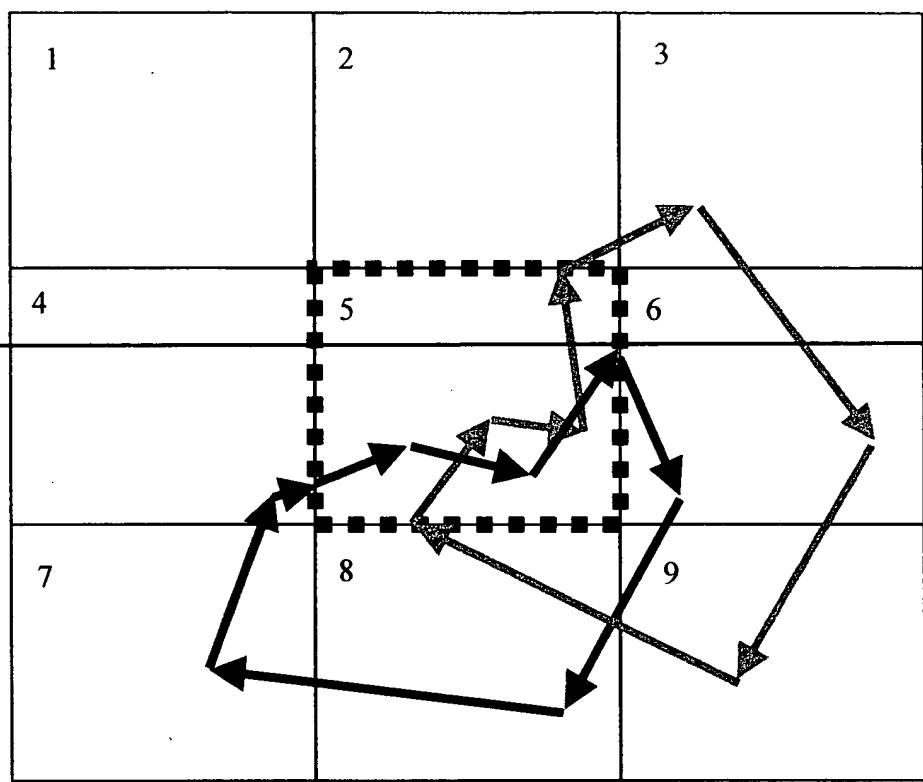


Fig. 16

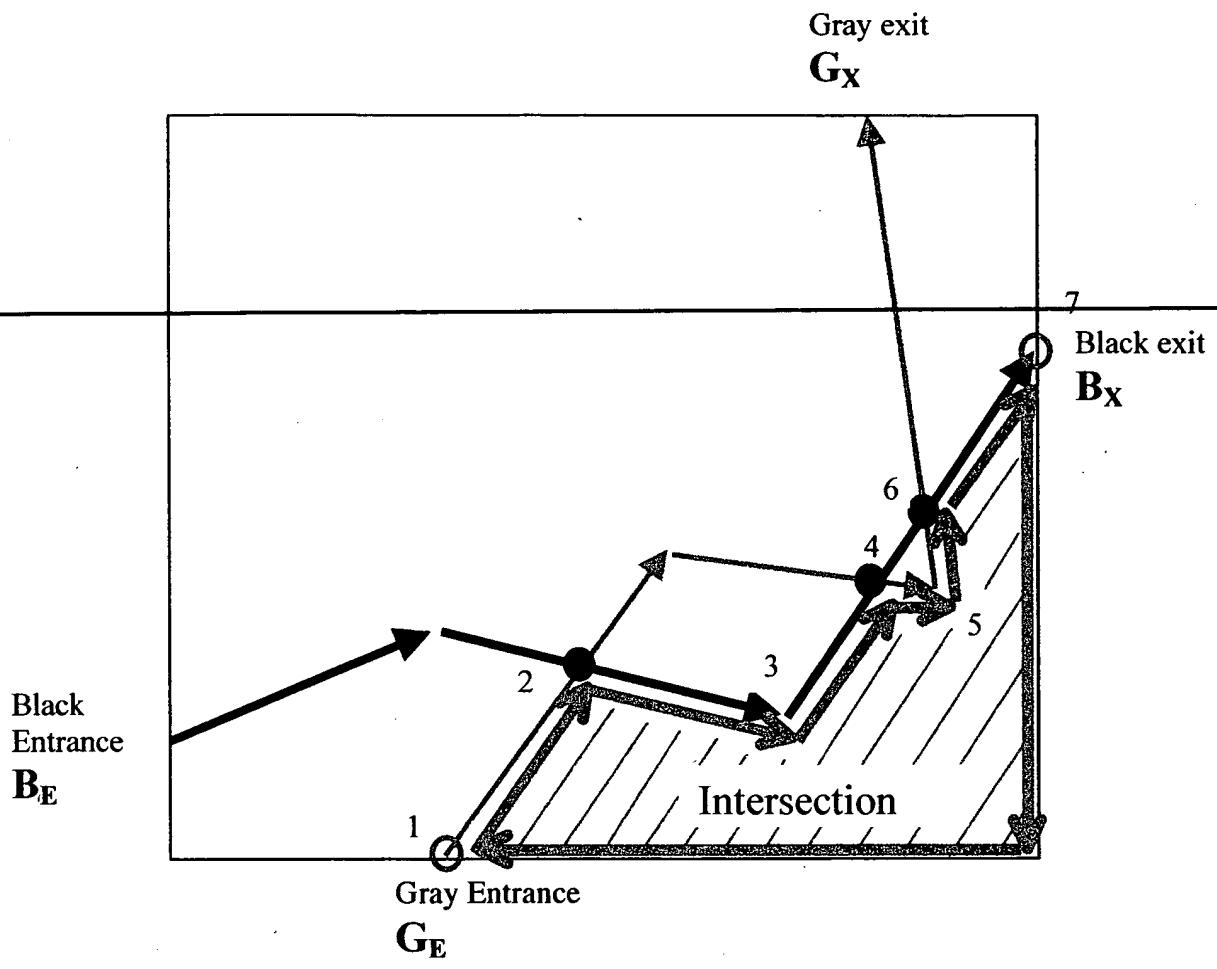


Fig. 17

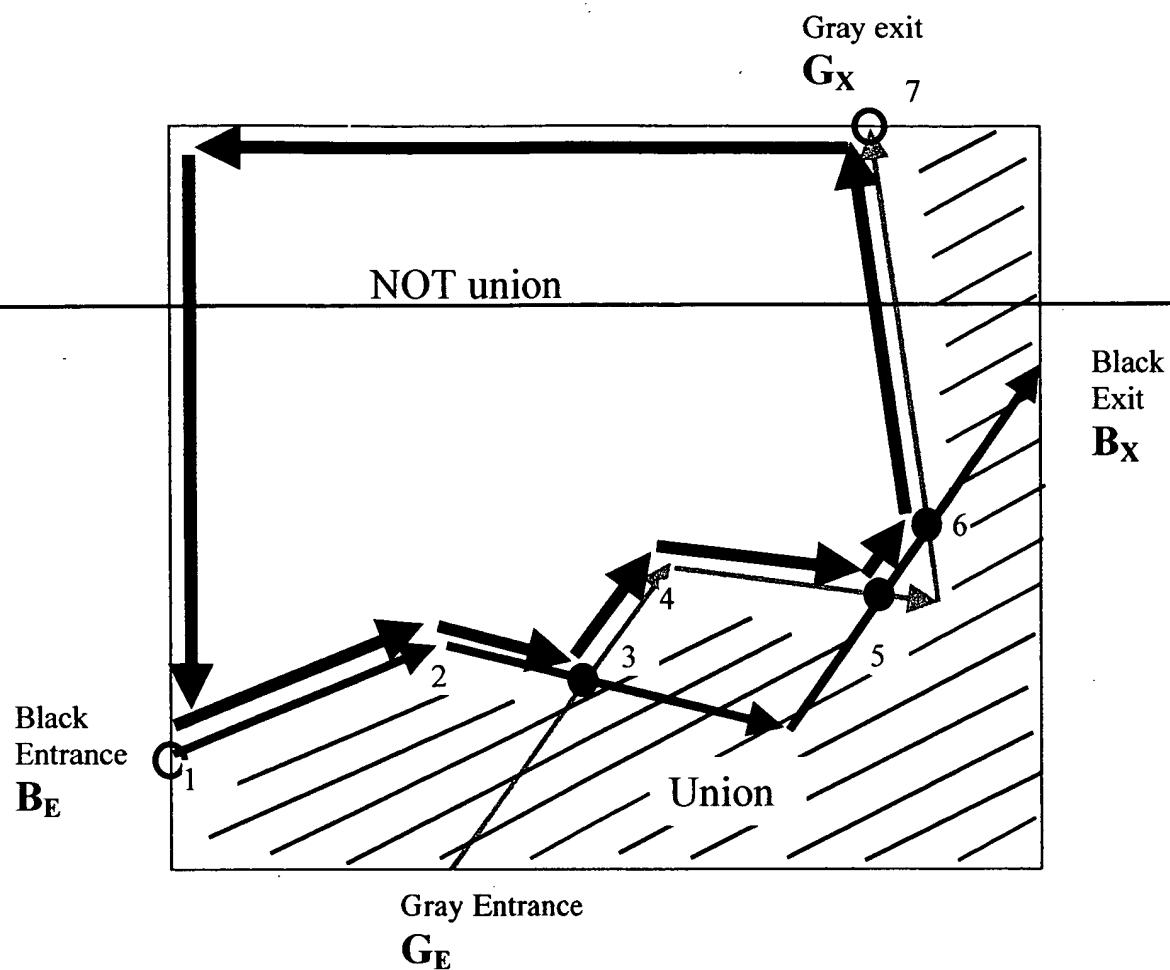


Fig. 18

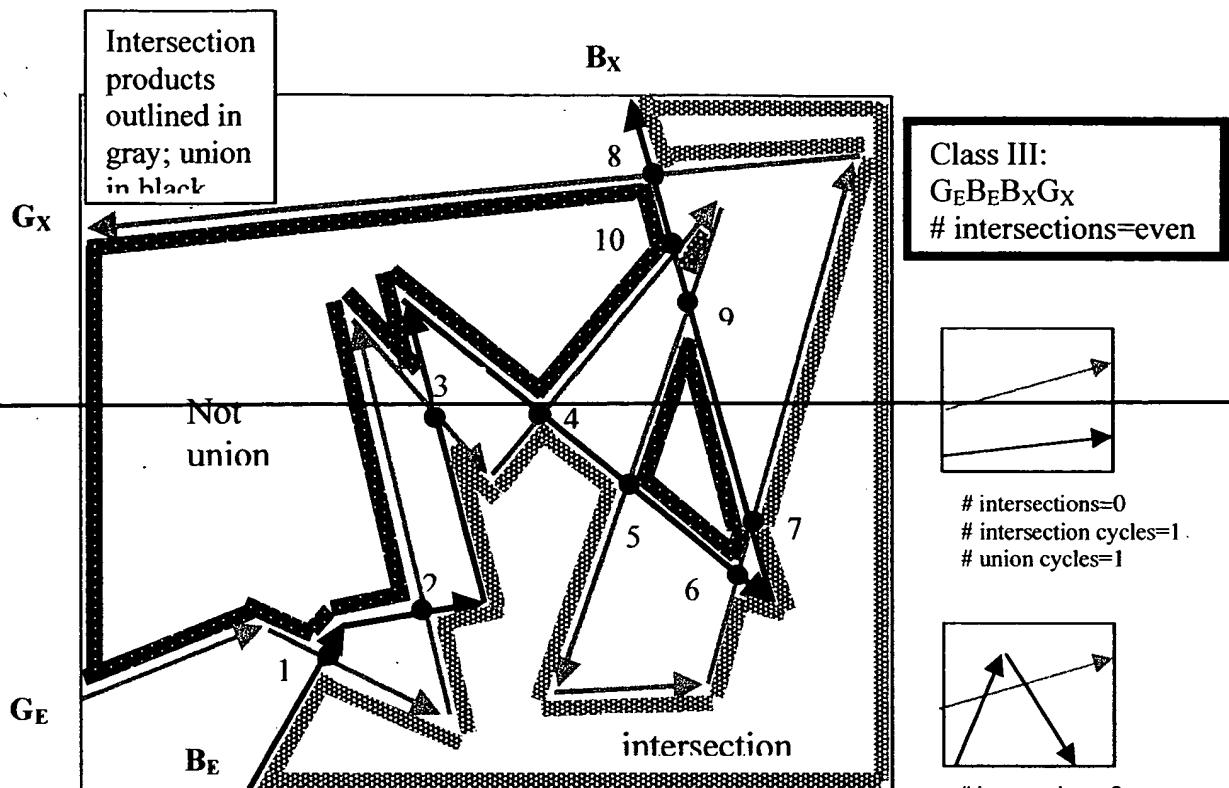


Fig. 19

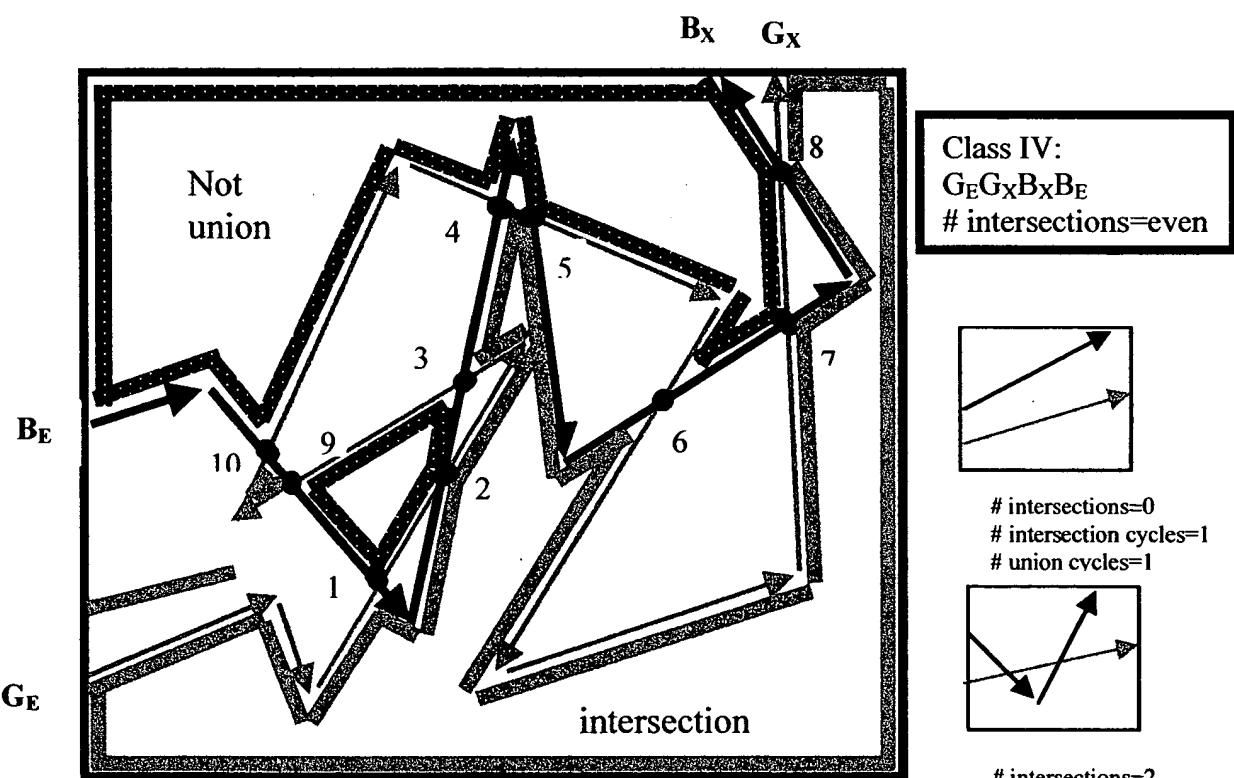


Fig. 20

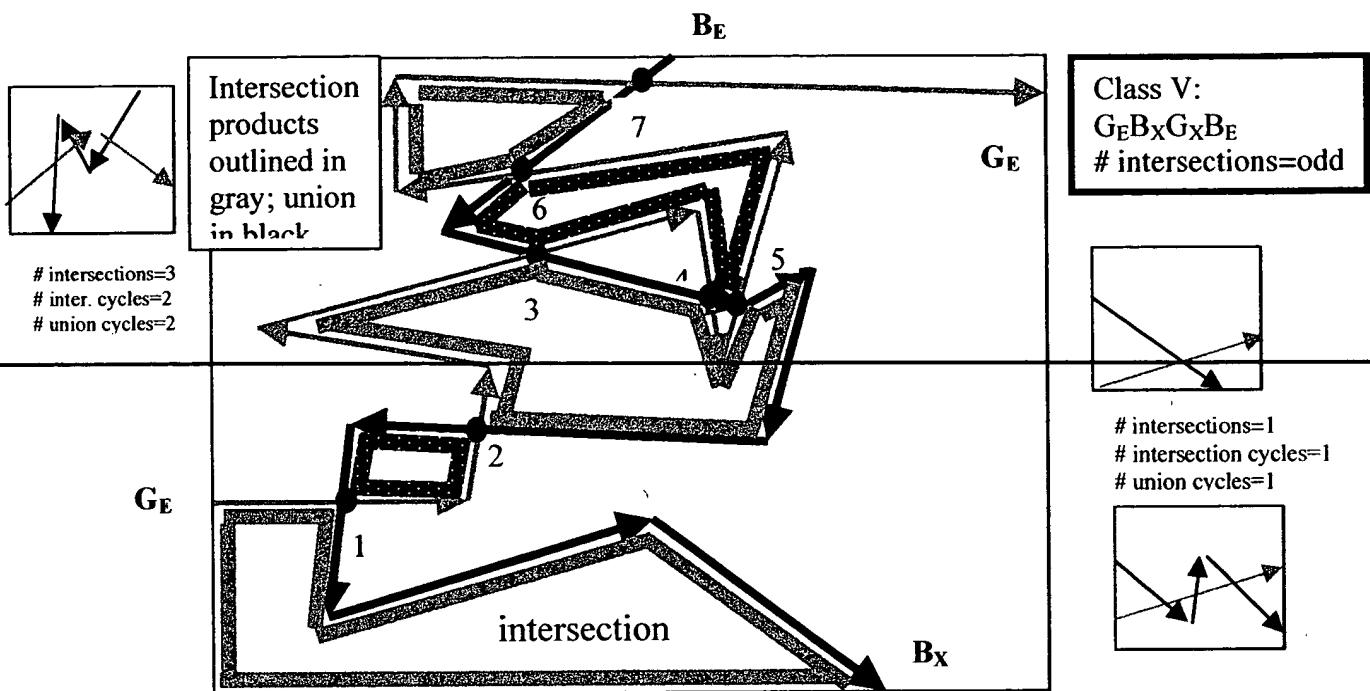


Fig. 21

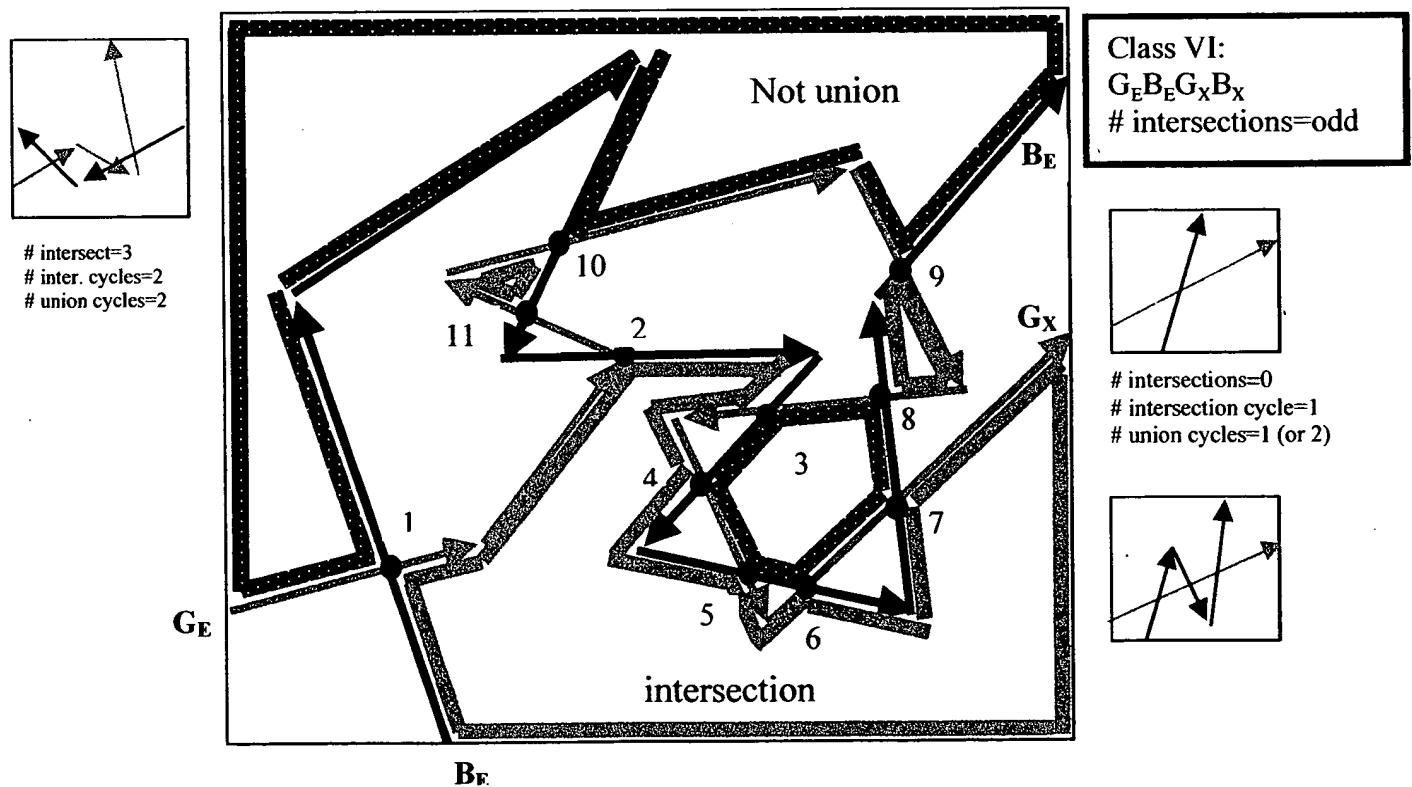


Fig. 22

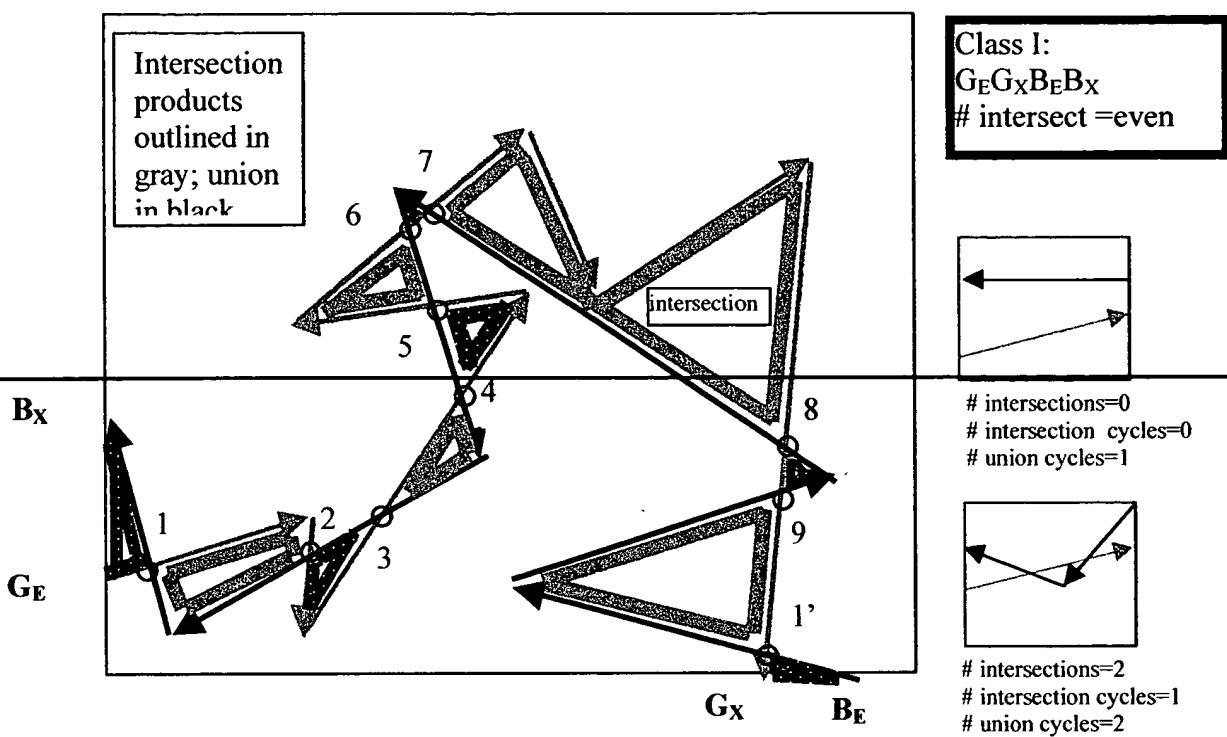


Fig. 23

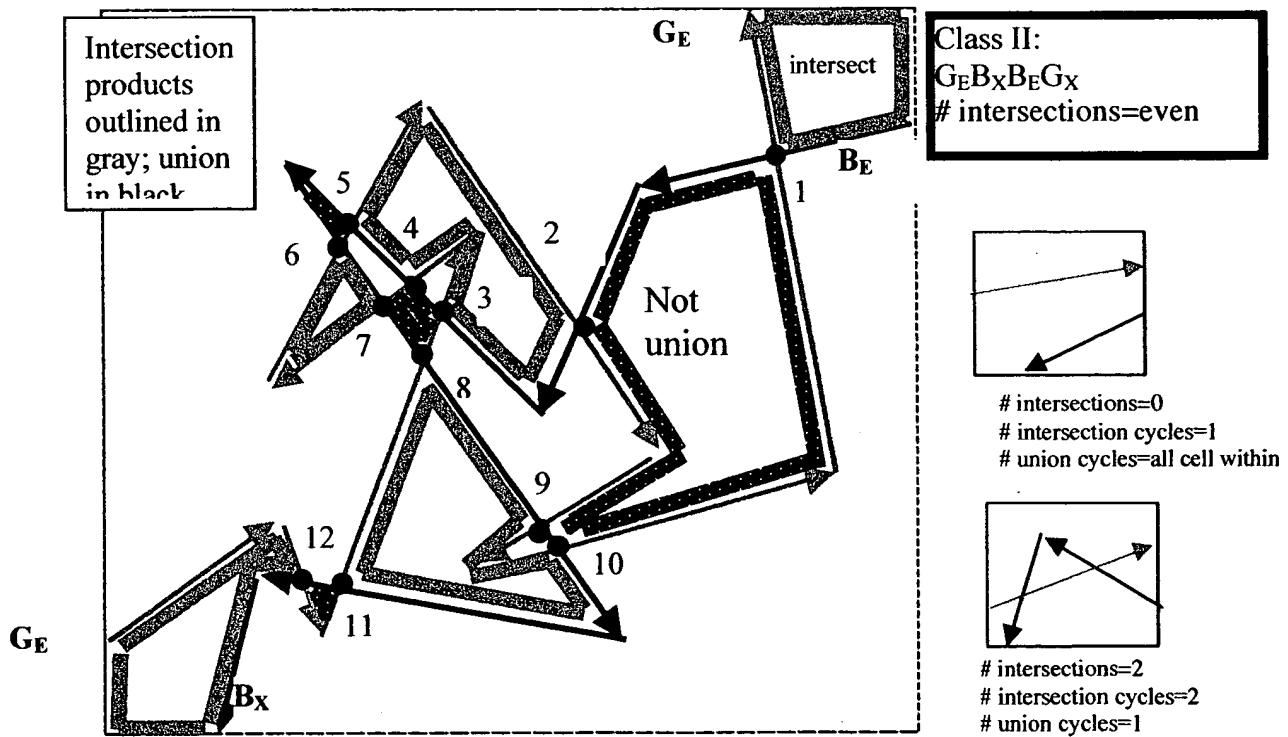


Fig. 24.

Class IV:
 $G_E G_X B_X B_E$

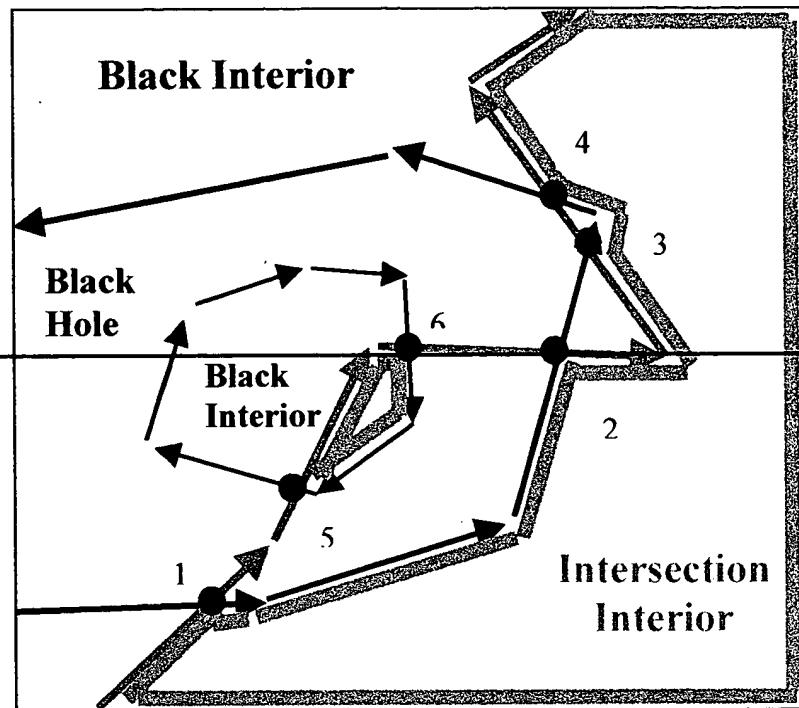


Fig. 25

Class I:
 $G_E G_X B_E B_X$

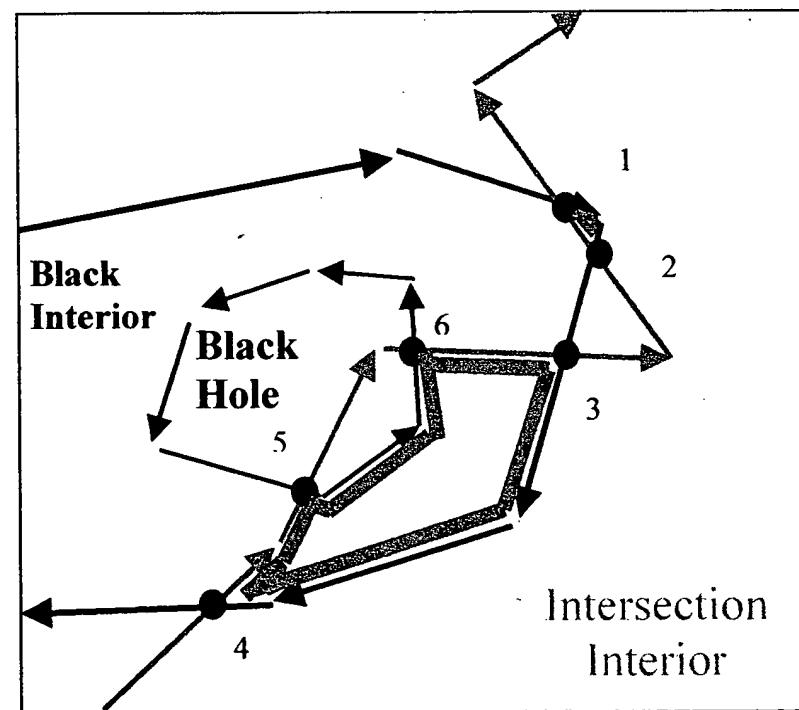


Fig. 26

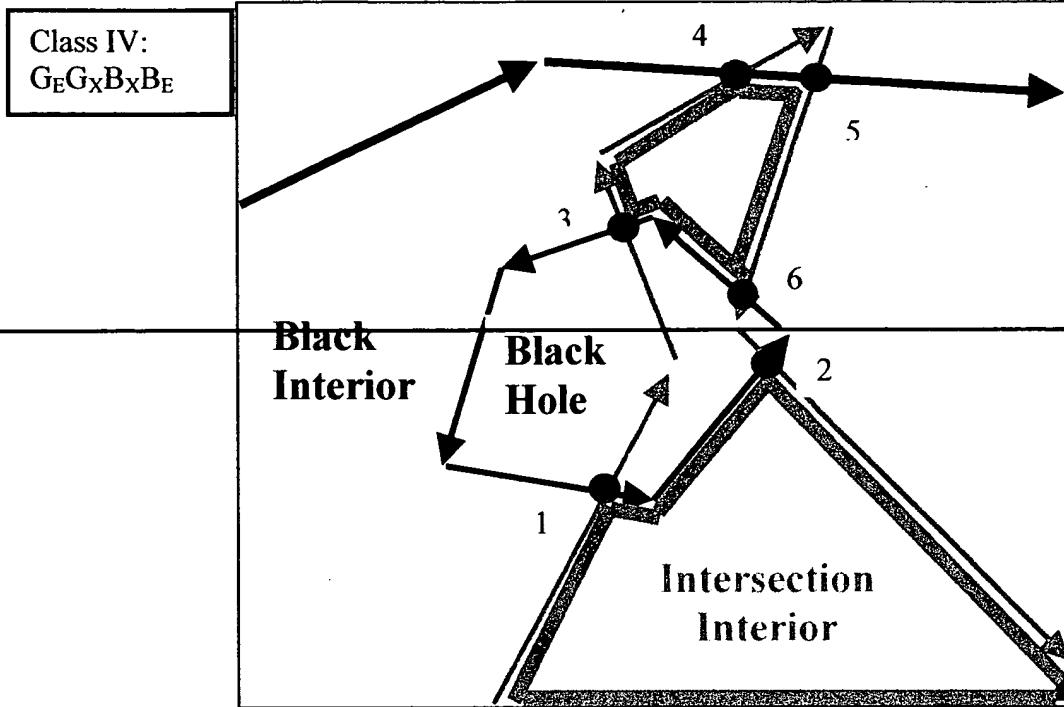


Fig.27

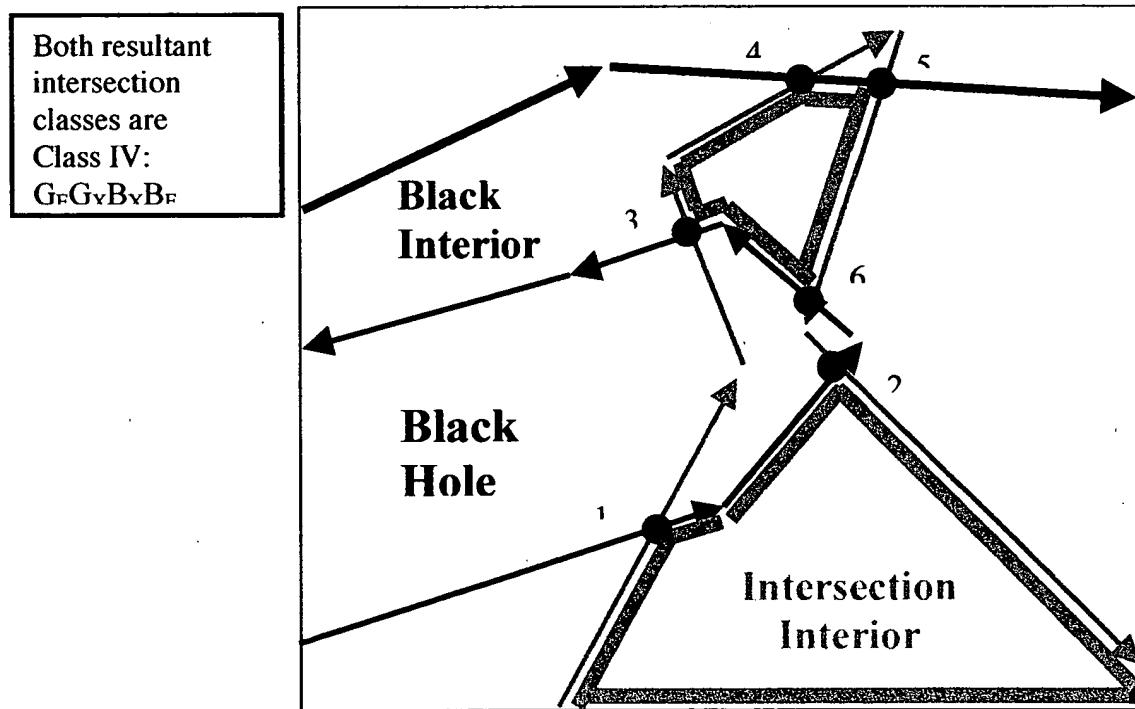


Fig. 28

Entry/Exit Relationship	Class	Total # of Intersect tuples within cell	Entry/exit relationship adjacent/ alternating	Special cases # Intersect points	Total Intersect Cycles (to the right)	Total # of NOT union cycles (to the right)	Total Intersect cycles (to the left)	Total # of NOT union cycles (to the left)
$G_E G_X B_E B_X$	I	even	adjacent	0 2	0 1	2 2	1 1	full cell 2
$G_E B_X B_E G_X$	II	even	adjacent	0 2	1 2	full cell 1	0 2	2 1
$G_E B_E B_X G_X$	III	even	adjacent	0 2	1 1	full cell 1	1 1	1 1
$G_E B_E G_X B_X$	VI	odd	alternating	1	1	1	1	1
$G_E G_X B_X B_E$	IV	even	adjacent	0 2	1 1	1 1	1 1	1 1
$G_E B_X G_X B_E$	V	odd	alternating	1	1	1	1	1

Fig. 29

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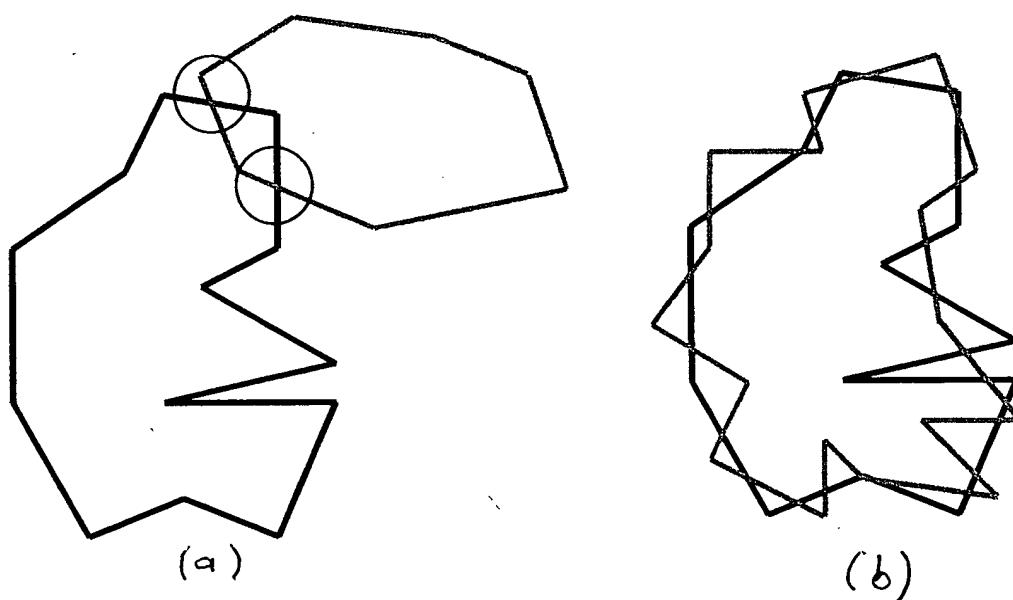


Fig. 30